WHAT IS CLAIMED IS:

1.   An image coder which compares a predetermined number of orthogonal transformation factors from an orthogonal transformation unit with quantization thresholds equal in number to the orthogonal transformation factors, and selectively quantizes the orthogonal transformation factors on the basis of the comparison result in coding processing, comprising:

a first scan converter for rearranging the orthogonal transformation factors in a first scan sequence and outputting the predetermined number of factors at a time; and

a second scan converter for rearranging quantized orthogonal transformation factors in a zigzag scan sequence and outputting the factors.

2.   The coder according to claim 1, wherein the first scan sequence is a sequence in which even-numbered samples are arranged in a forward direction from a start of the zigzag scan sequence, and odd-numbered samples are arranged in a reverse direction from an end of the zigzag scan sequence.

3.   The coder according to claim 1, wherein the first scan sequence is a sequence in which odd-numbered samples are arranged in a forward direction from a start of the zigzag scan sequence, and even-numbered samples are arranged in a reverse direction from an end of the zigzag scan sequence.

4.   The coder according to claim 1, wherein the first scan sequence is a sequence in which even-numbered samples are arranged in a forward direction from a start of a raster scan sequence, and odd-numbered

5   samples are arranged in the forward direction from an end line of the raster scan sequence.

5.   The coder according to claim 1, wherein the first scan sequence is a sequence in which odd-numbered samples are arranged in a forward direction from a

10   start of a raster scan sequence, and even-numbered samples are arranged in the forward direction from an end line of the raster scan sequence.

6.   The coder according to claim 1, wherein the first scan sequence is a sequence in which even-numbered

15   samples are arranged in a forward direction from a start of a raster scan longitudinal sequence, and odd-numbered samples are arranged in the forward direction from an end line of the raster scan longitudinal sequence.

20   7.   The coder according to claim 1, wherein the first scan sequence is a sequence in which odd-numbered samples are arranged in a forward direction from a start of a raster scan longitudinal sequence, and even-numbered samples are arranged in the forward

25   direction from an end line of the raster scan longitudinal sequence.

8.   The coder according to claim 1, wherein the first

scan sequence is a sequence arranged in a raster scan direction.

9.   The coder according to claim 1, wherein the first scan sequence is a sequence arranged in a raster scan longitudinal direction.

10.   The coder according to claim 1, wherein said first scan converter has a first scan sequence arranged in a raster scan direction, and a second scan sequence arranged in a raster scan longitudinal direction, and performs scan conversion upon adaptively selecting only one of the first and second scan sequences in accordance with an orthogonal transformation processing result obtained by said orthogonal transformation unit.

11.   An image decoder which decodes an image by performing inverse quantization processing, scan sequence conversion processing, and inverse orthogonal transformation processing for input quantized orthogonal transformation factors, comprising:

a first scan converter for converting the quantized orthogonal transformation factors in a first scan sequence and outputting not less than two factors;

a 0 determination unit for determining whether not less than two quantized orthogonal transformation factors output from said first scan converter are 0, and outputting a determination result;

a first selector for selecting not less than one of not less two quantized orthogonal transformation

factors;

a second selector for selecting not less than one of two quantization thresholds corresponding to not less than two quantized orthogonal transformation

5 factors;

a controller for controlling said first and second selector in accordance with a result obtained by said 0 determination unit, and generating/outputting a format signal from the determination result obtained by

10 said 0 determination unit;

an inverse quantization computation unit for performing inverse quantization computation processing by using not less than one quantized orthogonal transformation factor and not less than one

15 quantization threshold; and

a second scan converter for rearranging orthogonal transformation factors output from said inverse quantization computation unit in a second scan sequence and outputting not less than two factors.

20 12.   The decoder according to claim 11, wherein the second scan sequence is a raster scan sequence.

13.   The decoder according to claim 11, wherein the second scan sequence is a raster scan longitudinal sequence.

25 14.   The decoder according to claim 11, wherein the first scan sequence is a sequence in which even-numbered samples are arranged in a forward

direction from a start of the zigzag scan sequence, and odd-numbered samples are arranged in a reverse direction from an end of the zigzag scan sequence.

15.   The decoder according to claim 11, wherein the first scan sequence is a sequence in which odd-numbered samples are arranged in a forward direction from a start of the zigzag scan sequence, and even-numbered samples are arranged in a reverse direction from an end of the zigzag scan sequence.

16.   The decoder according to claim 11, wherein the first scan sequence is a sequence in which even-numbered samples are arranged in a forward direction from a start of a raster scan sequence, and odd-numbered samples are arranged in the forward direction from an end line of the raster scan sequence.

17.   The decoder according to claim 11, wherein the first scan sequence is a sequence in which odd-numbered samples are arranged in a forward direction from a start of a raster scan sequence, and even-numbered samples are arranged in the forward direction from an end line of the raster scan sequence.

18.   The decoder according to claim 11, wherein the first scan sequence is a sequence in which even-numbered samples are arranged in a forward direction from a start of a raster scan longitudinal sequence, and odd-numbered samples are arranged in the forward direction from an end line of the raster scan

longitudinal sequence.

19.   The decoder according to claim 11, wherein the
first scan sequence is a sequence in which odd-numbered
samples are arranged in a forward direction from a
5   start of a raster scan longitudinal sequence, and
even-numbered samples are arranged in the forward
direction from an end line of the raster scan
longitudinal sequence.

20.   The decoder according to claim 11, wherein the
10   first scan sequence is a sequence arranged in a raster
scan direction.

21.   The decoder according to claim 11, wherein the
first scan sequence is a sequence arranged in a raster
scan longitudinal direction.

15   22.   The decoder according to claim 11, wherein said
first scan converter has a first scan sequence arranged
in a raster scan direction, and a second scan sequence
arranged in a raster scan longitudinal direction, and
performs scan conversion upon adaptively selecting only
20   one of the plurality of scan sequences in accordance
with input quantized orthogonal transformation factors.

23.   An image coding method of comparing a
predetermined number of orthogonal transformation
factors with quantization thresholds equal in number to
25   the orthogonal transformation factors, and selectively
quantizing the orthogonal transformation factors on the
basis of the comparison result in coding processing,

comprising:

a first scan conversion step of rearranging the orthogonal transformation factors in a first scan sequence and outputting the predetermined number of

5 factors at a times; and

a second scan conversion step of rearranging quantized orthogonal transformation factors in a zigzag scan sequence and outputting the factors.

24. An image decoding method of decoding an image by

10 performing inverse quantization processing, scan sequence conversion processing, and inverse orthogonal transformation processing for input quantized orthogonal transformation factors, comprising:

a scan conversion step of converting the

15 quantized orthogonal transformation factors in a first scan sequence and outputting not less than two factors;

a 0 determination step of determining whether not less than two quantized orthogonal transformation factors output from the first scan conversion step are

20 0, and outputting a determination result;

a first selection step of selecting not less than one of not less two quantized orthogonal transformation factors;

a second selection step of selecting not less

25 than one of two quantization thresholds corresponding to not less than two quantized orthogonal transformation factors;

the control step of controlling the first and
second selection steps in accordance with a result
obtained in the 0 determination step;

an inverse quantization computation step of
5 performing inverse quantization computation processing
by using not less than one quantized orthogonal
transformation factor and not less than one
quantization threshold; and

a second scan conversion step of rearranging
10 orthogonal transformation factors output from the
inverse quantization computation step in a second scan
sequence and outputting not less than two factors.

25.   A computer-readable storage medium storing a
image coding program for causing a computer to compare
15 a predetermined number of orthogonal transformation
factors with quantization thresholds equal in number to
the orthogonal transformation factors and selectively
quantize the orthogonal transformation factors on the
basis of the comparison result in coding processing,
20 comprising:

a code for the first scan conversion step of
rearranging the orthogonal transformation factors in a
first scan sequence and outputting the predetermined
number of factors at a times; and

25   a code for the second scan conversion step of
rearranging quantized orthogonal transformation factors
in a zigzag scan sequence and outputting the factors.

26. A computer-readable storage medium storing an image decoding program for causing a computer to decode an image by performing inverse quantization processing, scan sequence conversion processing, and inverse

5   orthogonal transformation processing for input quantized orthogonal transformation factors, comprising:

a code for the scan conversion step of converting the quantized orthogonal transformation factors in a

10   first scan sequence and outputting not less than two factors;

a code for the 0 determination step of determining whether not less than two quantized orthogonal transformation factors output from the first

15   scan conversion step are 0, and outputting a determination result;

a code for the first selection step of selecting not less than one of not less two quantized orthogonal transformation factors;

20   a code for the second selection step of selecting not less than one of two quantization thresholds corresponding to not less than two quantized orthogonal transformation factors;

a code for the control step of controlling the

25   first and second selection steps in accordance with a result obtained in the 0 determination step;

a code for the inverse quantization computation

step of performing inverse quantization computation

processing by using not less than one quantized

orthogonal transformation factor and not less than one

quantization threshold; and

5   a code for the second scan conversion step of

rearranging orthogonal transformation factors output

from the inverse quantization computation step in a

second scan sequence and outputting not less than two

factors.